SURREBUTTAL TESTIMONY

OF

BRIAN HORII

ON BEHALF OF

THE SOUTH CAROLINA OFFICE OF REGULATORY STAFF

DOCKET NOS. 2021-143-E AND 2021-144-E

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND OCCUPATION.

A. My name is Brian Horii. My business address is 44 Montgomery Street, San Francisco, California 94104. I am a Senior Partner with Energy and Environmental Economics, Inc. ("E3"). Founded in 1989, E3 is an energy consulting firm with expertise in helping utilities, regulators, policy makers, developers, and investors make the best strategic decisions possible as they implement new public policies, respond to technological advances, and address customers' shifting expectations.

Q. ARE YOU THE SAME BRIAN HORII THAT FILED DIRECT TESTIMONY ON BEHALF OF ORS IN THESE PROCEEDINGS?

A. Yes. I previously provided direct testimony and six (6) exhibits on September 21, 2021, related to Duke Energy Carolinas, LLC's ("DEC") and Duke Energy Progress, LLC's ("DEP" and together with DEC, "Duke" or the "Companies") Applications for approval of Smart $aver Solar as Energy Efficiency ("EE") Programs ("Programs").

Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?

A. My surrebuttal testimony addresses the rebuttal testimonies filed by witnesses Timothy J. Duff and Lon Huber on behalf the Companies.

Surrebuttal to Timothy J. Duff

Q. WITNESS DUFF REFERS TO COMMISSION ORDER NO. 2021-569 NUMEROUS TIMES TO SUPPORT DUKE'S ASSERTION THAT SOLAR PV SHOULD BE CONSIDERED ENERGY EFFICIENCY ("EE"). (DUFF REBUTTAL, PP. 5, 7) DOES THE ORDER SUPPORT MR. DUFF'S ASSERTION?

A. No. ORS has not been able to find any evidence in the transcript, testimony, or proposed orders that any Party asserted that Solar PV is EE. If that were the case, ORS would have objected to this misclassification of Solar PV as EE.

Witness Duff conveniently assembles disjointed snippets of the Order that discuss the equivalency of customer-generators and EE. However, when one looks at those snippets in the context of the actual discussion in the Order, it is clear that there is no implication - Solar PV should be classified as EE, but simply that analysis methods or assumptions used to value the costs and benefits for EE should also be considered by the Commission to value the cost and benefits for Solar PV.

Specifically, the Order does not state that Solar PV is a type of EE, but actually states the following:

1. That the Commission has jurisdiction over Solar PV compensation just as it does over EE.

> Because the practice of netting does not involve the 'sale' of electricity, the Commission evaluates customer-generator programs like NEM or successor solar choice metering according to standards appropriate to other retail programs, including energy efficiency and demand-side management. (Order No. 2021-569, p. 6).

2. That evaluation **methods** used for EE should also be used for Solar PV consumed behind the meter.

> DEC/DEP Witness Harris testified that it is appropriate to view the long-run marginal costs of customer-generation differently based on whether the generation is consumed behind the meter or is 'excess energy' exported to the grid. (Tr. p. 353.13, line 23 —Tr. p. 353.14, line 6) For behind the meter consumption, Witness Harris testified that the impact is the same as if the customer had 'reduced their consumption through an energy efficiency or demand-side management program' and should be evaluated in a similar manner. *Id.* For excess energy, Witness Harris stated that it should be evaluated in the same fashion as the Companies' avoided costs. (Order No. 2021-569, p. 16)

> All self-generation that is consumed by a customer-generator within the billing period is, from the system perspective, equivalent to energy efficiency or demand-side management measures as a decrement to system load. (Order No. 2021-569, pp. 5-6, Findings of Fact 5)

3. That solar PV should be evaluated with a 20-year horizon – similar to the use of useful lives for EE evaluations.

> Additionally, as several witnesses observed, it is standard practice for the Commission to consider the cost-effectiveness of demand-side management and energy efficiency investments over the useful lives of those assets or programs. The Commission agrees with witnesses Beach and Harris that solar energy that is consumed by a customer over the course of a billing period to offset purchases from the utility looks like a reduction/decrement to load akin to energy efficiency, when viewed at a system perspective. (Order No. 2021-569, pp. 18-19)

4. That in terms of the application of integration costs, Solar PV consumed behind-the-meter shall be treated like EE.

> As discussed by Witnesses Beach and Harris, behind-the-meter consumption is equivalent to energy efficiency and any changes in load associated with offsetting purchases from the grid at any given time by any given customer will be smoothed by geographic and class diversity. (Order No. 2021-569, p. 47)

Again, the plain language of the Order states that analysis methods used to evaluate EE should also be used to evaluate customer-generation. Therefore, Witness Duff's assertion based on the liberal interpretation of the Commission's Finding of Fact #5 on page 52 is false and should be rejected.

Q. DO YOU AGREE WITH WITNESS DUFF'S CLAIMS THAT "THE PROGRAM WILL REDUCE CUSTOMERS' GRID ENERGY USAGE MORE COST-EFFECTIVELY THAN THE COMPANIES BUILDING NEW SUPPLY SIDE RESOURCES, WHICH IS A WIN FOR ALL CUSTOMERS?" (DUFF REBUTTAL, P. 6)

A. No. Witness Duff's statement is premised on his assertion that the Programs are cost effective from a UCT perspective. In other words, he asserts that the avoided cost benefits of the Programs will be larger than the incentive and administrative costs to the utility. There are two problems with his claim.

First, the Programs are not a "win for all customers" because they are not cost effective from the TRC perspective, even under the Companies' own analyses. The TRC test looks at the total costs of installing the Solar PV versus the avoided cost benefits that Solar PV provides. The Programs fails the TRC test, which indicates Solar PV costs more to install than the avoided cost benefits that it provides. Since someone has to pay for the Solar PV (be it participants or non-participants via the cost-shift imposed on them), at the end of the day, some group of customers will be paying more for electricity than they would have without the Programs.

Second, the actual avoided cost benefits from the Programs will be far lower than the benefits estimated by the Companies because of free riders. The Programs benefits only come from the small fraction of customer-generators that would not have adopted Solar PV if it were not for the EE incentive program. I show in my direct testimony that 79% of the customers that can be expected to participate in the Programs would likely have adopted solar even if the program did not exist. Therefore, only 21% of the benefits can be attributed to the Programs, the Programs will not be cost-effective even under the UCT test, and the Programs will not be a "win" for all the Companies' customers. However, the Programs will be a "win" for the Companies' shareholders because of capture of the revenue decrease due to customer self-generation in the calculation of net lost revenue and the additional shareholder incentives provided by classifying Solar PV as EE. The Programs also will be a "win" for the private investors of solar installation companies because they will be the indirect recipients of the up-front incentives paid by Duke, which cost recovery for the up-front incentive will be requested from all DEC and DEP customers.

Q. DOES ORDERING PARAGRAPH 8.C IN COMMISSION ORDER NO. 2021-569 THAT DIRECTS THE VALUE STACK SHOULD ONLY APPLY SOLAR INTEGRATION COSTS TO EXPORTED POWER CHANGE YOUR DIRECT TESTIMONY?

A. No. The role of the system operator is to keep supply and demand on the grid in balance. Whether that balance is stressed by a reduction in generation supply due to a drop in solar output or an increase in customer load due to a drop in customer-sited solar output, the impact on the need for additional generation is fundamentally the same.

My direct testimony provides the Commission with a more accurate representation of the costs and benefits that would accrue from Solar PV. However, should the Commission choose to eliminate solar integration costs from the cost effectiveness evaluation of generation consumed by customer-generators, my conclusions remain the same: Solar PV is not EE, Solar PV does not pass the TRC test, and Solar PV does not pass the UCT.

Q. WITNESS DUFF STATES THAT "THE PROGRAM PROPOSED IN THIS CASE IS NOT UNLIKE THE COMBINED HEAT AND POWER ("CHP") PROGRAM PREVIOUSLY PROPOSED BY THE COMPANIES, SUPPORTED BY ORS, AND APPROVED BY THE COMMISSION." (DUFF REBUTTAL, P. 9) PLEASE RESPOND TO WITNESS DUFF'S IMPLICATION THAT SOLAR PV SHOULD BE CONSIDERED AS EE SINCE CHP WAS PREVIOUSLY APPROVED.

A. Contrary to Witness Duff's claim, CHP is not remotely similar to Solar PV. CHP involves burning fuel in a prime mover such as a gas turbine or reciprocating engine to generate electricity and then using the waste hot exhaust to process heat, hot water, or space heating/cooling. By capturing the waste heat from the electrical generation process and converting some of it into useful thermal energy thereby reducing the need to burn fossil fuels, the CHP increases the overall efficiency above that of the Companies' generating system. In other words, less fossil fuel is required to provide the same electricity and thermal energy to the customer than when the customer purchases electricity from the Companies and burns fossil fuel for thermal needs.

The key aspect of the CHP is the use of the waste exhaust heat for useful onsite thermal uses. Through CHP's usage of the waste exhaust heat, the overall efficiency of the total heat and power system typically achieves 60% to 80% efficiency in converting the consumed fuel into useful energy, as compared to about 30% for the utility grid.[1] It is this increase in overall efficiency, realized by putting to use exhaust heat that would otherwise be wasted, that makes it reasonable to include CHP as part of an EE program. Indeed, the amount of the EE incentive is based on surpassing a minimum CHP system efficiency threshold and surpassing the prevailing efficiency of the Duke grid.[2]

By comparison, Solar PV does not increase the efficiency of energy usage but only displaces the energy purchased from the Companies and does nothing to increase the efficiency of any of the energy using devices or appliances in the home. Therefore, Solar PV should not be classified as EE.

Q. DO YOU AGREE WITH WITNESS DUFF'S ASSERTION THAT SOLAR PV MEETS THE DEFINITION OF EE BECAUSE IT "ELIMINATES THE WASTE OF THE ENERGY COMING FROM THE SUN?" (DUFF REBUTTAL, PP. 9-10)

A. No. The use or lack of use of energy produced by the sun is not the efficiency issue here. If the use of or lack of use of the energy produced by the sun were the sole requirement to be classified as an EE program as proposed, then any generator burning ethanol would qualify as an EE program since that fuel originates with the photosynthetic conversion of sunlight into plant matter.

[1] EIA Working Papers, *CHP Industrial Bottoming and Topping Cycle with Energy Information Administration Survey Data*, 2015 https://www.eia.gov/workingpapers/pdf/chp-Industrial_81415.pdf
[2] Duke Energy Combined Heat and Power Updated July 29, 2019

The definition of EE that Witness Duff replicates from my testimony is "Energy efficiency simply means using less energy to perform the same task – that is, eliminating energy waste." Energy waste in this context refers to the amount of energy that is consumed, but not converted into the intended useful product. For example, an energy efficient air conditioner may produce the same amount of cooling as an inefficient air conditioner but require only 80% of the electricity of the inefficient air conditioner. The energy efficient air conditioner reduces waste by converting more of the input electricity into useful cooling. Another example of energy efficiency is the sealing of leaks and increasing the insulation around heating and cooling ducts. This reduces waste by allowing more of the heating or cooling to reach the intended conditioned spaces rather than being lost to the attic or outside. Witness Duff's assertion that harnessing the sun to produce electricity constitutes elimination of **energy** waste is severely flawed and a theory that I have never heard used in a regulatory proceeding.

Witness Duff continues to try to link Solar PV to solar hot water heating because solar hot water heating has been approved as a pilot EE program. He points to the fact that they both use the sun and both can reduce customer purchases from the grid, but he fails to show that Solar PV actually satisfies the definition of EE. In contrast, my example of a solar hot water system clearly demonstrates that a solar hot water system increases efficiency by allowing hot water to be delivered to the household using less electricity or natural gas because the incoming cold water is pre-heated by the solar hot water panels. The solar hot water system reduces energy waste by allowing the hot water system to, for

example, use electricity to heat the water from 100 degrees to 120 degrees instead of having to use electricity to heat the water from 50 degrees to 120 degrees.

Q. WITNESS DUFF POINTS OUT THAT ORS HAS PREVIOUSLY RELIED UPON THE UCT RESULTS TO REVIEW RECENT EE/DSM FILINGS BY THE COMPANIES. (DUFF REBUTTAL, PP. 1-12). DOES THE PRIOR USE OF THE UCT BY ORS DICTATE THAT ORS AND THE COMMISSION CANNOT CONSIDER OTHER COST TESTS?

A. No. As I discuss later, the Commission has explicitly recognized the value of multiple cost-effectiveness test perspectives. Moreover, the Commission in Order Nos. 2021-32 and 2021-33 did not foreclose the review of other cost-effectiveness tests for EE/DSM. Therefore, ORS's review of the Program is not, and should not, be restricted to only focus on the UCT.

Q. WITNESS DUFF THREATENS THAT ORS SHOULD NOT BE PERMITTED TO "ARBITRARILY PROPOSE TO UTILIZE A DIFFERENT COST TEST" BECAUSE IT WOULD UNWIND THE SETTLEMENT THAT ORS ENTERED INTO ON THE EXISTING EE/DSM MECHANISM. (DUFF REBUTTAL, PP. 11-12) PLEASE RESPOND TO WITNESS DUFF'S WARNING.

A. Witness Duff and I disagree on this issue. There is nothing arbitrary about the application of the TRC cost-effectiveness test to this Program. That is a well-established cost-effectiveness test that was used and continues to be used by Dominion Energy South Carolina ("DESC"). As for the unsubstantiated threat that ORS's recommendation to use the TRC in addition to the UCT will "unwind" the settlement on all existing EE/DSM

programs approved by the Commission, I disagree with the "all or nothing" premise claimed by Witness Duff. My position is that the Commission has the discretion to and should consider the benefits of multiple cost tests for the proposed Program, which is clearly contemplated in Commission Order No. 2021-569, page 51, as shown below:

> Commission Conclusions
>
> The Commission concludes that the disagreement as to which cost-benefit tests or methods should be used in this proceeding illustrates the importance of receiving all relevant information into evidence of record, then using the Commission's judgment and discretion to properly assign weight to the evidence presented. Consistent with the desire to fully receive relevant information, the Commission finds that all the cost-benefit tests presented in this case illustrate different, relevant perspectives and information. Therefore, in this and future proceedings, the use of a variety of relevant cost-benefit tests may be considered and appropriately weighed by the Commission in its discretion.

Q. PLEASE RESPOND TO WITNESS DUFF'S ARGUMENT ON PAGE 12 AND HIS DISCUSSION OF THREE (3) REASONS WHY THE UCT IS SUPERIOR TO THE TRC TEST. ARE THESE VALID REASONS TO IGNORE THE TRC TEST?

A. No. I reproduce those points below from page 12 of Witness Duff's rebuttal testimony, and then address each argument in turn.

> First moving from TRC to UCT will mitigate the severity of the unintended negative impact that advancement of energy efficiency codes and standards can have on the cost effectiveness of an efficiency measure.
>
> Second, the adoption of the UCT will give the Company more capability to respond to changes in the market and avoided costs by allowing a change to the financial incentive that it pays to customers for an efficiency measure to impact the cost effectiveness of the measure.
>
> Finally, the move to UCT will ensure that the energy efficiency benefits achieved by a program for the utility system are greater than the cost to the utility system to offer that program.

DEP Application at 5, Docket No. 2015-163-E (June 26, 2020).

The first point of Witness Duff is basically that UCT allows the Companies to implement programs that would not pass the TRC on their own merits. Advancements in codes and standards certainly make it more difficult to pass the UCT and TRC test because the benefits of an EE program are lessened by the advancements. The classic example is incandescent lightbulbs. Compared to an incandescent light bulb, the savings from an LED bulb are tremendous. However, compared to a compact florescent ("CFL") bulb, the savings of an LED bulb are not nearly as large since a CFL is also more efficient than an incandescent bulb. When codes and standards remove incandescent bulbs from the market, then DEP can no longer claim the same large benefits from an LED program since the customer's alternative would be a CFL bulb; however, that is not an unintended negative impact. If codes and standards advancements will require the installation of more efficient light bulbs, then the need for DEP's EE light bulb program should be re-examined and the EE Program should be revaluated or perhaps abandoned if the reduced benefits no longer justify the costs.

The second point made by Witness Duff illustrates that use of the UCT provides the Companies with the sole ability to increase or decrease the cost-effectiveness test

results by simply changing the program incentive amount. In contrast, the cost-effectiveness of a program under the TRC test is driven by the fundamental costs of the program (i.e., the cost of the efficient device and the total utility costs to administer the program); therefore, the TRC test is largely immune from utility program design decisions. The Companies' ability to control the cost-effectiveness test results is even more reason that the TRC test results should also be considered, especially for new programs that have not previously passed the TRC test screening, such as the proposed Programs.

While the third point made by Witness Duff is true, it does not foreclose the Commission's consideration of the TRC cost-effectiveness test. In fact, the Commission has not historically approved EE/DSM programs that fail the TRC (with the exception of low-income programs or those explicitly deemed to be for societal good), and I believe that the exclusion of TRC results from Commission consideration would be unwarranted.

I agree that the Commission should be concerned with the Companies' costs to implement an EE/DSM program since those costs are ultimately passed to the Companies' customers. The UCT focuses on those Company costs. Equally important are the total costs that will be borne by the Companies' customers as a whole because of the EE/DSM programs. The TRC test looks at the total costs borne by Companies' customers. The Commission should carefully balance the Companies costs with the customers' cost burden. Therefore, my recommendation to reject the proposed Programs is supported.

Q. WITNESS DUFF SPECULATES THAT YOU "IGNORE THE OVERALL GOALS AND RESULTING SAVINGS FROM EE/DSM PROGRAMS" IN YOUR CONCERNS OVER DISTORTIONS OF EE GOALS AND ACHEIVEMENTS. (DUFF REBUTTAL, P. 10) IS THIS A CORRECT CHARACTERIZATION OF YOUR TESTIMONY?

A. No. In fact, it is the exact opposite. The reason I raise those points in direct testimony is because of my concern over how total EE program targets and goals could be affected.

Q. WITNESS DUFF ALSO STATES THAT "MR. HORII ESSENTIALLY STATES THAT THE COMMISSION SHOULD REJECT A VIABLE, COST-EFFECTIVE EE/DSM PROGRAM BECAUSE IT WOULD RESULT IN INCREASED SAVINGS FOR THE COMPANIES' CUSTOMERS" (DUFF REBUTTAL, P. 10) IS THAT A CORRECT CHARACTERIZATION OF YOUR TESTIMONY?

A. No. I testify that the proposed Programs should be rejected because they are not EE and are not cost-effective. Witness Duff's general statement about savings for the customers as a result of the proposed Programs are speculative and contrary to the available evidence. I also raise concerns over the classification of Solar PV as EE that, to my knowledge, no regulatory body in the country has allowed or approved. Indeed, in response to ORS AIR 1-14, the Companies indicated that they did not know of any utilities or state jurisdictions that have an EE program similar to the Companies' proposal.

Q. WITNESS DUFF PROVIDES A TABLE OF COST EFFECTIVENESS RESULTS ASSUMING THE COMMISSION APPROVED WINTER BRING YOUR OWN THERMOSTAT ("BYOT") COSTS AND BENEFITS ARE INCLUDED IN A TOTAL PROGRAM VIEW. (DUFF REBUTTAL P.14) PLEASE RESPOND TO WITNESS DUFF'S COMPARISON.

A. I expect the Companies' calculations contain the same flaws of overestimated transmission and distribution ("T&D") value and underestimated free riders (which inflates the cost-effectiveness results). I offer these observations and recommendations on the table contained on Witness Duff's Rebuttal Testimony page 14:

1. It is not unusual for jurisdictions to allow non-cost-effective activities to be bundled with highly cost-effective activities in order to provide a program or portfolio that is broad in scope or reach but remains cost-effective in aggregate. However, if that is done, there should be a strong justification for including the non-cost-effective activities. The Winter BYOT program is an already approved and established EE/DSM program. If the proposed Solar PV as EE Programs only pass a cost-effectiveness test when the BYOT benefits and costs **are** included, then it begs the question of whether it is in the best interest of customers for the Commission to approve Solar PV that is not cost-effective on its own. To be sure, the Duke proposed Programs would likely drive higher participation on the Winter BYOT program, but higher participation in Winter BYOT could also be obtained via the Companies offering higher Winter BYOT incentives or improving their efforts to inform customers about the Winter BYOT.

2. The fact that the combined DEC and DEP TRC is equal to 1.0 does not support adoption of the proposed Programs for both Companies combined for the reasons I list below.

- The proposed Programs are not EE.
- The TRC of 1.0 and the UCT results are overestimated because of the DEC and DEP analysis flaws discussed in my direct testimony.
- Programs for DEC and DEP should be evaluated independently. DEC and DEP have separate avoided costs so it is correct that the cost-effectiveness results would differ for the two utilities, and that decisions to approve programs would consider the unique results for each utility. Moreover, if the proposed Programs were cost-effective for one utility but not the other, then adoption of the proposed Programs for both utilities would only lessen any positive net benefits and potentially result in overall negative net benefits if adoptions in the non-cost-effective service territory were to be too strong.

Q. WITNESS DUFF STATES THAT TRC RESULTS COULD HAVE BEEN HIGHER HAD THE COMPANY ASSUMED THAT THE SOLAR PV WERE FINANCED AT AN INTEREST RATE LOWER THAN THE UTILITY DISCOUNT RATE. (DUFF REBUTTAL P.14) WHAT IS YOUR RESPONSE?

A. Mathematically, Witness Duff is correct that the present value of the costs would be lower if the financing rate and any administrative costs for a third-party lease or loan from a company like Sunrun were small compared to the Companies' discount rates used

for the cost effectiveness calculations. However, Witness Duff provides ORS and the Commission with no information on which to verify that financing costs would be lower than the Companies' discount rates. It is also possible that the third-party lease or loan financing costs would be higher than the Companies discount rate. Absent specific data about South Carolina third-party solar leasing, financing costs and total deal structures, ORS cannot verify the Companies' inference of potential changes in TRC test results.

Q. PLEASE RESPOND TO THE OBJECTIONS WITNESS DUFF MAKES TO THE ORS RECOMMENDED CORRECTIONS TO THE DEC AND DEP T&D CAPACITY BENEFIT CALCULATIONS. (DUFF REBUTTAL P.15)

A. Witness Duff makes numerous irrelevant or unimportant objections to my T&D corrections and I address each one in list form below.

1. Companies' Claim in Rebuttal: "Mr. Horii's contention is based on lack of knowledge of the EE/DSM Recovery Mechanisms." (p. 15, lines 8-9) Response: My contention is based on over thirty (30) years of experience in the field with exceptionally deep expertise in T&D avoided costs. I was retained by ORS to provide the Commission with my expert opinion on the appropriateness of including Solar PV as an EE program and the cost effectiveness of that program. To the extent there are flaws in the Companies' current analyses, I believe it is appropriate and necessary to correct such flaws.

2. Companies' Claim in Rebuttal: "Mr. Horii's recommendation would add a significant new assumption and variability into the assessment of cost-effectiveness." (p. 15, lines 15-16)

Response: DEC and DEP assume that the amount of T&D reduction that would be provided by a program is the amount of load reduction at the time of the DEC and DEP system peaks. That is an extremely simplistic assumption that utilities like PG&E abandoned decades ago. Because the utility grid is made up of a myriad of T&D subsystems that peak at times that differ from the system peak, a far more accurate method of determining T&D peak reductions is to look at program load reductions during those various peaks. It is a simple calculation to perform, and, at the end of the day, a single T&D average peak kW reduction for each program can be derived. In short, my recommendation is not for a "new assumption" but a more accurate estimate of the T&D peak reduction.

3. Companies' Claim in Rebuttal: "[A] new specific circuit avoided T&D rate would need to be derived in lieu of using the current system average rate." (p. 15, lines 16-17)

Response: Circuit-specific avoided T&D capacity costs are not needed to implement my proposed correction. There are two parts in calculating the T&D avoided cost benefit from load reductions. The first part is the avoided T&D capacity cost per kW of load reduction, which is what the Companies refer to as the "avoided T&D rate." The second part is the amount of peak

reduction one gets on the T&D system from the load reductions. That is the T&D peak kW reduction. Multiplying the avoided cost rate by the T&D peak kW reduction gives you the T&D avoided cost benefit from the load reductions.

My proposal is to improve the second part – the estimation of the T&D peak kW reduction offered by the Solar PV. That improved T&D peak reduction can be used with the existing avoided T&D rate, and that is the approach I used in my direct testimony. In general, circuit-specific avoided T&D capacity costs are necessary for local integrated resource planning studies that design custom EE/DSM/DER programs tailored to the specific characteristics of a particular portion of the utility system. However, in my experience, circuit-specific avoided T&D rates would not be necessary for system-wide EE/DSM.

4. Companies' Claim in Rebuttal: "Mr. Horii ignores that all other EE and DSM program measures are located on specific circuits and would require similar treatment." (p. 15, lines 19-20)

Response: The proposed Solar PV as EE question is before the Commission in this Docket. The necessity to make the ORS recommended improvement for other EE/DSM can be addressed in future proceedings. An improvement should not be rejected out of hand simply because it may require more analytical vigor and effort. The Companies appear to advocate

for an "all or nothing" approach to implementation of new EE/DSM programs and the Commission should reject this premise.

5. Companies Claim in Rebuttal: "The reality is that the Companies applied the approved methodology for determining avoided T&D costs associated with EE and DSM programs which, until this case, has never been questioned by the ORS or any other party in South Carolina." (p. 15, lines 20-23)

Response: I believe this is irrelevant. I am not here as an auditor to determine whether past practices have been adhered to. I am here as an expert witness to offer my expert opinion. I am not bound by the opinions, or lack thereof, of past South Carolina EE/DSM participants. Also, each Commission Order contains this statement: "This Order will remain in full force and effect until further order of the Commission". Therefore, ORS can make relevant and necessary adjustments to protect customers. The Companies' Claim should be rejected.

Q. PLEASE RESPOND TO WITNESS DUFF'S CLAIM THAT THE ORS FREE-RIDER ANALYSIS IS FUNDAMENTALLY FLAWED BECAUSE ORS USES FORECASTS OF SOLAR ADOPTION FOR ONLY RS CUSTOMERS. (DUFF REBUTTAL, P. 17)

A. As I state in my Direct Testimony, I use the RS (customers that also use natural gas) data in order to keep the data clean when looking at adoption forecasts under the old NEM tariffs and the successor Solar Choice tariffs (without any EE incentive). Using solar

adoption forecasts that are for all customers or just for all-electric customers has the inherent risk of incorporating an EE incentive into the forecasts and thereby making the information unsuitable for the free-rider analysis. Also, I relied upon the RS customer forecast because DEP advised ORS it was not able to separate its solar adoption forecasts between all-electric and other residential customers. So even if I had tried to use all-electric customer data, DEP would not have been able to produce such information.

Regarding the applicability of the results using the RS data, I am confident that the free-rider percentage for customers on that rate schedule would be similar to the free-rider percentage for customers on the all-electric RE schedule or on DEP residential rate schedules. Although there may be some differences for these customers (such as the size of expected Solar PV installations), the fundamental economics and payback periods would be similar.

To confirm the similarity of the fundamental economics, I examined the usage patterns of RS and RE customers using the hourly class load research data provided by the Companies in response to ORS AIR 4-16. I found that the annual percentage of energy used by RS and RE customers by Time of Use ("TOU") period were virtually the same. To be sure, the usage varied between winter and non-winter months, but only differences in the annual totals would be impactful because the Solar Choice Tariff TOU rate levels (the cents per kWh) are the same for the winter and non-winter seasons. The similarity of energy usage by TOU period indicates that the bill savings from Solar PV for RS and RE customers would be basically the same, and therefore the adoption rates should be basically the same.

Q. WITNESS DUFF STATES ON REBUTTAL PAGE 18 THAT SOLAR ADOPTION FOR THE COMPANIES IN 2020 WAS ONLY 0.23% OF ALL RESIDENTIAL CUSTOMERS. PLEASE RESPOND TO WITNESS DUFF'S ASSERTION THAT THE LOW 2020 ADOPTION RATE SUPPORTS A 10% FREE-RIDER PERCENTAGE.

A. The Companies' narrow lens focuses only on customer adoption rates in 2020 which was a year heavily influenced by COVID. This perspective is not the correct way to evaluate future market uptake or customer adoption propensity. Instead, one should consider the total prevalence of Solar PV in the company service territories. Based on the Companies' response to ORS AIR 5-2, more than 2% of DEC and DEP homeowners will have adopted solar by the end of 2021.[3]

To put that in perspective, assume you are driving down the street and the neighborhood has ten (10) houses on each side of the block. That means you will have seen one hundred (100) houses after driving five (5) blocks (fifty (50) houses on each side of the street). If solar PV is installed on 2% of homes, that equals on average, one (1) solar roof every fifty (50) homes. So there is a good chance that after over your five (5) block drive you would have seen at least one (1) Solar PV system on one side of the street, and perhaps another Solar PV system on the other side of the street (depending on how the roofs face and where the solar panels are installed).

[3] 10,807 residential adoptions through 2021 from ORS AIR 5-2. Homeowners are based on 667,000 customers from Duff Rebuttal p.18 and 69.4% owner occupied housing unit rate from 2019 US Census **https://www.census.gov/quickfacts/fact/table/SC,US/PST045219**

For such a short drive, that would reflect a good amount of Solar PV participation, and a tremendous amount of free "advertising" for the Solar PV. Unlike an efficient light bulb, or a more efficient air conditioner, everyone in the neighborhood will see the Solar PV system (unless it is on the back roof). Add to that the amount of press coverage of Solar PV, the myriad of websites about solar (including those hosted by the Companies), and the zero money down financing offered by solar installers. Therefore, Solar PV is clearly in another league from little known, untrusted, and obscure EE alternatives with 10% free rider values.

Q. WITNESS DUFF DISCUSSES CONDUCTING AN EVALUATION, MEASUREMENT AND VERIFICATION ("EM&V") STUDY <u>AFTER</u> THE PROGRAM IS ADOPTED IN ORDER TO UPDATE THE FREE-RIDER PERCENTAGES AT A LATER DATE. PLEASE RESPOND TO THE COMPANIES OFFER TO MAKE A FUTURE UPDATE.

A. I recommend the proposed Program be rejected as proposed. The Companies' proposal is not an EE program, it does not pass the TRC test, and it does not pass the UCT. The Companies have failed to justify their proposed Program.

<u>Surrebuttal to Company Witness Lon Huber</u>

Q. PLEASE RESPOND TO WITNESS HUBER'S CLAIM THAT THE "COMMISSION'S OWN PRECEDENT MAKES CLEAR THAT SOLAR MAY FUNCTION AS AN EE MEASURE." (HUBER REBUTTAL, P. 7)

A. First, I take note of his careful choice of language in his Rebuttal Testimony. Witness Huber does not claim that solar **is** an EE measure. Instead, Witness Huber uses a

vague statement that it "may function as EE." Furthermore, Witness Huber does not specifically define what "function or functions" Solar PV will serve as an EE measure, nor does Witness Huber's Rebuttal Testimony demonstrate that such functions qualify Solar PV to be classified as EE. For illustration, I may function as a medical doctor by giving my daughter an aspirin, but I most certainly am not a medical doctor, and am not deserving of any rights or privileges accorded to that profession.

Second, while it is difficult for me to verify the accuracy of Witness Huber's statement, given its vagueness, it is clear that neither of the examples that Witness Huber provides to support his statement would support the conclusion that Solar PV is EE. The first example provided by Witness Huber on page 6 of the Rebuttal Testimony is that "the Commission expressly ordered that when evaluating consumption of behind-the-meter solar energy, that consumption 'shall be treated as energy efficiency or demand-side management resources.' Order No. 2021-569 at 52"

As I pointed out previously a complete reading of Order No. 2021-569 reveals that when the Commission is discussing the similarities of Solar PV and EE, those similarities are in four (4) specific areas: 1) Commission jurisdiction over Solar PV retail compensation; 2) evaluation methods; 3) timeframe to be used in evaluations; and 4) solar integration costs for energy consumed behind the meter. Nowhere in the Order does the Commission indicate that Solar PV is EE, should be considered EE, or should be given the same shareholder and net lost revenue treatment as EE.

The second example, also from pages 6-7 of Witness Huber's Rebuttal Testimony is reproduced below:

> As for Act 62's broader goal of continuing the deployment of all DERs in South Carolina, the **Solar Choice Tariffs** properly recognize emerging technologies and the ability to contribute to **reductions in utility peak electrical demand** and other drivers of electrical utility costs by also establishing **a platform for customers to adopt other DERs in the future, including energy efficiency measures and battery storage**.
>
> Order No. 2021-390 at 42, Docket Nos. 2020-264-E and 2020-265-E (May 30, 2021) (emphasis added).

As with the first example, this statement does not state Solar PV **is** EE. If anything, it draws a distinction between Solar PV and other Distributed Energy Resources ("DERs") like EE and battery storage. I find that the language cited by Witness Huber does not support the Companies' assertion that Solar PV should be classified as an EE program.

Q. WITNESS HUBER ASSERTS THAT THERE ARE "SPECIFIC" ADVANTAGES THAT COULD BE GAINED FROM ALLOWING SOLAR CHOICE CUSTOMERS TO ALSO PARTICIPATE IN THE PROGRAM. (HUBER REBUTTAL, P. 7) PLEASE RESPOND TO WITNESS HUBER'S ASSERTION.

A. The question and answer contained in Witness Huber's Rebuttal Testimony is innocuous, vague, and without any quantification of benefits that the Commission could incorporate into its consideration of the Program. Moreover, the specific advantages of customer response to TOU pricing and the Winter BYOT program are not directly related to Solar PV, other than the current requirement that proposed Program participants are subject to TOU pricing and the Winter BYOT program. The Winter BYOT program was approved by the Commission prior to the proposed Program being requested, and the Companies have the flexibility to offer optional TOU rates to any customer class, subject to Commission approval. Of course, since the proposed Programs would require customer

participation in TOU rates and Winter BYOT, it could offer some benefits due to customer-generators being on TOU rates and the Winter BYOT. However, the Companies have neither quantified how much those increased benefits might be, nor demonstrated that the proposed Programs are a cost-effective way to obtain any increased benefits.

Q. WITNESS HUBER STATES THAT CUSTOMERS SUPPORT THE PROPOSED PROGRAM AS EVIDENCED BY A SURVEY OF 20,000 CUSTOMERS AND THE FOCUS GROUPS CONDUCTED BY A THIRD-PARTY. (HUBER REBUTTAL, PP. 7-8) PLEASE RESPOND TO WITNESS HUBER'S ASSERTION THAT SOUTH CAROLINA CUSTOMERS SUPPORT THE PROPOSED PROGRAM.

A, First, the issue of customer acceptance or support is not relevant to the issue of whether Solar PV should be classified as an EE program. Second, Witness Huber provides no specific details on the exact questions 20,000 of the Companies over 800,000 customers were asked in the survey and vaguely detailed focus groups. Without that detail, ORS is unable to determine whether survey respondents and focus group participants were given the information in a way that allowed them to meaningfully answer the questions or to determine to what extent their answers may be relevant to the issues in these Dockets. Instead, the information provided by the Companies is only a simple recitation of a few statistics and is not a meaningful indication that the proposed Programs should be approved.

Q. WITNESS HUBER STATES THAT "IT IS NOTEWORTHY THAT THE PROGRAM PASSES THE NOTORIOUSLY TOUGH RIM TEST." (HUBER REBUTTAL, P. 8) IN YOUR OPINION, IS PASSING THE RIM TEST A SUFFICIENT REASON TO APPROVE THE PROPOSED PROGRAM?

A. No. The proposed Programs fail cost-effectiveness from the TRC and UCT perspectives. Therefore, even if Solar EE were deemed to be EE (which I have shown it should not), the proposed Programs would fail the cost-effectiveness test, regardless of the RIM test results. Also, I note that the Companies only produced the RIM test results in Rebuttal Testimony, not Direct. Further, when ORS asked the Companies in discovery to "[i]dentify, quantify, and explain how the Company determined the cost-effectiveness of the Proposed Program[,]" the Companies did not disclose that RIM testing had been performed, indicating that the Companies' Applications – which only identified UCT and TRC testing – included the results of the cost effectiveness testing associated with the Programs.[4] The Companies did not supplement their responses to ORS discovery. Accordingly, ORS did not have the same opportunity to review and verify the RIM results because the Companies did not disclose them to ORS prior to filing their Rebuttal Testimony.

Q. WITNESS HUBER CRITIQUES THE COST ASSUMPTIONS USED FOR THE ORS TRC ANALYSIS. (HUBER REBUTTAL, PP. 8-9) PLEASE EXPLAIN HOW ORS OBTAINED THE COST ASSUMPTIONS.

[4] DEC and DEP Responses to ORS AIR 1-6; *see also* DEC and DEP Responses to ORS AIR 1-7.

A. I used the cost assumptions provided by the Companies in response to ORS AIRs 1-1 and 1-7. Specifically, I used the same costs that DEC and DEP used for their TRC test calculations.

Q. WITNESS HUBER ASSERTS THAT "BY DISREGARDING THE LARGE NUMBER OF CUSTOMERS WHO LEASE OR FINANCE THEIR SYSTEMS, WITNESS HORII IS IGNORING THE ECONOMICS OF THESE FINANCING STRUCTURES AND THEREBY ARTIFICIALLY LOWERING THE TRC RESULTS FOR THE PROGRAM" (HUBER REBUTTAL, P. 9) PLEASE EXPLAIN WHY THIS IS NOT A VALID ASSERTION.

A. As I stated previously, I utilized the exact same TRC cost information that the Companies used for their analyses presented to the Commission in these Dockets. The Companies now assert that the ORS analysis is "artificially lowering" the TRC results because of a supposed shortcoming in the Companies' data that ORS relied upon. I note that the Companies do not acknowledge the supposed shortcoming of their cost estimates in their Direct Testimony nor in the responses to ORS discovery. Therefore, the Companies' assertion that ORS is "disregarding" or "ignoring" financing economics would seem to be more appropriately turned inward to the Companies themselves. And while Witness Huber is quick to criticize, he provides no data that Parties could review or the Commission to consider.

Further, when the regulatory process becomes a game of "gotcha" where the Companies use poor data and information and then criticize the Parties for relying on that same data and information, transparency and trust in the regulatory process decreases.

Q. HAVE THE COMPANIES CONCLUSIVELY DEMONSTRATED THAT THIRD-PARTY FINANCING CAN LOWER THE PRESENT VALUE COST OF SOLAR PV?

A. No, they have not. On page 9 of his Rebuttal Testimony, Witness Huber asserts that present value costs **could** be lower, but provides no actual support for his statement that financing increases the TRC results. Given that the Companies have no facts to support their assertion, it would be easy for another Party to assert competing positions with no support. For example, a Party may assert a position that third-party solar leasing companies have a higher cost of capital than the Companies, and that the necessary cash flows to the third-party solar leasing company would have a higher present value cost to the homeowner than an outright purchase – which would make the proposed Program less cost-effective under the TRC test. In addition, a Party may argue that third-party solar leasing companies could extract a premium from customers because they allow the customers to easily attain a solar system with little or no up-front cost – which would lower the TRC test results. As a final example, a Party could assert that the third-party solar leasing companies could extract a premium just as auto dealers extract a premium from car buyers by focusing the transaction on optimal monthly payments rather than total system costs, which would also lower the TRC results. In short, Witness Huber's assertions and claims are unsupported and should be given no weight.

Q. WITNESS HUBER DISCUSSES THE FLAWS IN COMPANIES' SOLAR ADOPTION FORECASTS THAT THE COMPANIES PROVIDED TO ORS. (HUBER REBUTTAL, PP. 9-10) DO THOSE FLAWS MAKE YOUR ESTIMATES OF FREE RIDERS THAT RELY ON THAT DATA LESS RELIABLE FOR USE IN THIS DOCKET?

A. No. It is important to understand that I used the Companies' forecasts to estimate the free rider percentage. For that calculation, it is the ratio of the two (2) forecasts provided by the Companies -adoptions under the Solar Choice Tariffs and adoptions with the NEM level of compensation- that matter the most. Witness Huber discusses the complexity of the Solar Choice Tariffs and an increase in customer uncertainty because of the inability of potential customers to understand the Companies new Solar Choice Tariffs and be "less certain" about the specific bill savings. The implication is that adoptions of Solar PV under the Solar Choice Tariff plus the added incentive contained in the proposed EE Program would be lower than the adoptions under the old NEM tariff even though the payback periods are similar.

The issue of rate complexity – customer uncertainty and marketing difficulty would likely not affect the free-rider percentage. Recall that the solar forecast "is based on a regression between simple payback period and historical adoption." (Huber Rebuttal, p. 9) Rate complexity or customer uncertainty was not incorporated into the company forecasts provided to ORS for a) adoptions under the Solar Choice Tariff or b) adoptions under NEM rates. Because the free rider percentage is the ratio of the two adoptions forecasts (forecast "a" divided by forecast "b"), if both forecasts drop by the same percentage, then the free

rider percentage would be unchanged. Witness Huber has argued that rate complexity would result in fewer adoptions than indicated by forecast "b" (the NEM forecast). However, if that is true, rate complexity would also result in fewer adoptions for forecast "a" (the adoptions under the complex Solar Choice tariff). The result is that both forecasts would be lower and there is no evidence that that the free-rider percentage resulting from the ratio of a lower forecast "a" divided by a lower forecast "b" would be different from what ORS has estimated as the free-rider percentage. In short, Witness Huber's theory on rate complexity may be correct, but there is no evidence that it would alter the free-rider percentage.

Q. WITNESS HUBER PROVIDED NUMEROUS ASSERTIONS FOR ENHANCED ADOPTIONS BECAUSE OF THE UP-FRONT INCENTIVE OF THE PROGRAM. (HUBER REBUTTAL, PP 10-11) WHAT IS WITNESS HUBER'S FREE-RIDER PERCENTAGE?

A. Witness Huber does not provide the Commission with a free-rider percentage alternative to ORS's recommendation. Moreover, his reasons for enhanced adoptions are not necessarily true. For example, Witness Huber states that the up-front incentive "reduces the total amount of capital that needs to be financed, which is critical for customers without access to low-cost capital, such as certain low-income customers." (Huber Rebuttal, p. 11) This statement, however, ignores his earlier testimony that "a large portion of the market is third-party owned or financed solar." (Huber Rebuttal, p. 9). For that large portion of the market capital access is not an issue.

Or, there is Witness Huber's statement that "[a]n up-front incentive is an important marketing tool for rooftop solar installers, and this marketing value is not captured in a payback period calculation." (Huber Rebuttal, p. 11). If an up-front incentive would make a substantial difference in Solar PV adoptions, it is difficult to believe the Clean Energy Advocates did not require an up-front incentive as part of the structure of the Solar Choice Metering tariff. In short, Witness Huber provides nothing in his Rebuttal Testimony to derive an actual free-rider percentage.

Q. PLEASE SUMMARIZE YOUR SURREBUTTAL TESTIMONY.

A. My testimony addresses the rebuttal testimonies of Duke Witnesses Duff and Huber and shows the following:

1. Witnesses Duff and Huber are incorrect in asserting that Order 2021-569 supports Duke's assertion that Solar PV should be classified as EE.
2. Witness Duff's assertion that the proposed Programs would be a "win for all customers" is incorrect.
3. Witness Duff is incorrect in asserting that Commission approval of CHP as an EE/DSM program supports approval of the Solar PV Programs as EE/DSM.
4. Witness Duff's claim that Solar PV is EE because it eliminates "the waste of the energy coming from the sun" is not correct.
5. Witness Duff is incorrect in asserting that the TRC test cannot be used to evaluate EE programs.

6. Prior Duke arguments for using the UCT are not compelling reasons to exclude the TRC test from consideration by the Commission.

7. Witness Duff's speculation that the consideration of financing costs would have increased the cost-effectiveness of the proposed Programs is unsupported by any data and should be given no weight.

8. Witness Duff's objections to improving the estimate of T&D peak reductions from the proposed Programs are unfounded, misplaced, or irrelevant.

9. Use of adoption forecasts for RS customers to determine the free-rider percentage is reasonable and not fundamentally flawed.

10. The low percentage of solar adoptions in COVID-affected 2020 does not justify the Companies' 10% free rider assumption for Solar PV,

11. Witness Huber's claims that there are additional advantages that could be gained from the proposed Programs are not quantified, nor is it shown that Solar PV is a cost-effective means for obtaining those gains.

12. Witness Huber's reference to customer approval of the program is unsupported, unclear as to its applicability, and therefore not a meaningful indication of whether the Commission should approve the proposed Programs.

13. Witness Huber's claim that ORS is "artificially lowering the TRC results for the program" is completely misplaced because ORS relies on the same data provided and used by DEC and DEP.

14. Witness Huber does not provide any data to support his assertion that consideration of financing costs would lower TRC costs, and I show that other theories regarding financing costs could result in an increase in TRC costs.

15. Finally, I show that Witness Huber's alleged flaws in the data that the Companies provided to ORS for the free-rider analysis do not indicate that the ORS free-rider percentage is flawed.

Q. PLEASE SUMMARIZE YOUR OVERALL RECOMMENDATION.

A. ORS recommends rejection of the proposed Applications.

Q. WILL YOU UPDATE YOUR SURREBUTTAL TESTIMONY BASED ON INFORMATION THAT BECOMES AVAILABLE?

A. Yes. I fully reserve the right to revise my recommendations via supplemental testimony should new information not previously provided by the Company, or other sources, becomes available.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. YES, IT DOES.